

11-24-00

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UTILITY PATENT APPLICATION TRANSMITTAL (Small Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
6185-221D1XX/09807491

Total Pages in this Submission

TO THE ASSISTANT COMMISSIONER FOR PATENTSBox Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

APPARATUS AND METHOD FOR ATTACHING HEAT EXCHANGE UNIT AND VALVE TO THE BOTTOM OF SELF-COOLING AND SELF-HEATING FOOD OR BEVERAGE CONTAINERS

and invented by:

Jeffrey W. Chen

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:
☐ Continuation ☒ Divisional ☐ Continuation-in-part (CIP) of prior application No.: 09/229,294

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.:

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.:

Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 13 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☒ Cross References to Related Applications (if applicable)
 - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - d. ☐ Reference to Microfiche Appendix (if applicable)
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings (if drawings filed)
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

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Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
- a. ☒ Formal b. ☐ Informal Number of Sheets 4
4. ☒ Oath or Declaration
- a. ☐ Newly executed (original or copy) ☐ Unexecuted
- b. ☒ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)
- c. ☒ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☒ Incorporation By Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Computer Program in Microfiche
7. ☐ Genetic Sequence Submission (if applicable, all must be included)
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☒ Assignment Papers (cover sheet & documents)
9. ☐ 37 CFR 3.73(b) Statement (when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement/PTO-1449 ☐ Copies of IDS Citations
12. ☒ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
- ☐ First Class ☒ Express Mail (Specify Label No.): EL341557030US

11/22/00 JD944 U.S. PRO

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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☒ Small Entity Statement(s) - Specify Number of Statements Submitted: 1
17. ☒ Additional Enclosures (please identify below):

Petition for Three-Month Extension of Time

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

18. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

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(Small Entity)

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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	8	- 20 =	0	x \$9.00	\$0.00
Indep. Claims	1	- 3 =	0	x \$40.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$355.00
OTHER FEE (specify purpose) <u>Petition for Three Month Extension of Time</u>					\$445.00
TOTAL FILING FEE					\$800.00

- ☐ A check in the amount of _____ to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. **50-0337** as described below. A duplicate copy of this sheet is enclosed.
- ☒ Charge the amount of **\$800.00** as filing fee.
 - ☒ Credit any overpayment.
 - ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
 - ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: November 22, 2000


Signature
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cc: DOCKETING

I hereby certify that this Preliminary Amendment is being deposited with the United States Postal Service on November 22, 2000, as Express Mail No. EL341557030US, in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.

Denia Amezcua
Denia Amezcua

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application Of:)

Jeffrey W. Chen)

Serial No.:)

Filing Date: November 22, 2000)

Entitled: APPARATUS AND METHOD FOR)
ATTACHING HEAT EXCHANGE)
UNIT AND VALVE TO THE BOTTOM)
OF SELF-COOLING AND SELF-)
HEATING FOOD OR BEVERAGE)
CONTAINERS)

Prior Examiner:

M. Jimenez

Prior Group Art

Unit: 3726

Assistant Commissioner for Patents
BOX PATENT APPLICATION
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

This is a Preliminary Amendment to the Divisional Application filed herewith. Please amend the application as follows:

IN THE SPECIFICATION:

After the title and before the Background of the Invention please insert the following:

CROSS-REFERENCE WITH RELATED APPLICATIONS

This application is a Divisional of Application Serial No. 09/229,294, filed January 13, 1999 which is incorporated herein by reference.

Please further amend the specification as follows:

At Page 6, line 18, please delete "there-through" and insert - - therethrough - -.

Page 6, line 18, please delete "there between" and insert - - therebetween - -.

Page 8, line 9, after "polishing" please insert - - buff - -.

IN THE CLAIMS:

Please cancel claims 1-7.


REMARKS

The claims under consideration are 8-16 directed to a container and remain in the application for action on the merits.

The Commissioner is hereby authorized to charge any additional fees which may be required or credit any overpayment to Account No. 50-0337.

Respectfully submitted,

Dated: November 22, 2000


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**THE APPARATUS AND METHOD FOR ATTACHING
HEAT EXCHANGE UNIT AND VALVE TO THE BOTTOM OF
SELF-COOLING AND SELF-HEATING FOOD OR
BEVERAGE CONTAINERS**

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Background of the Invention

This invention relates generally to self-cooling and self-heating fluid containers and more specifically to such a container which includes a heat exchange unit affixed internally thereof and which is portable and disposable.

Description of the Prior Art

Many foods and beverages available in portable containers are preferably consumed when they are chilled, for example, carbonated soft drinks, fruit drinks, beer, water, puddings and gelatins and the like are preferably consumed with temperature varying between 35° Fahrenheit and 50° Fahrenheit. When the convenience of refrigerators or ice is not available, such as when fishing, camping, on the beach or the like, the task of cooling these foods or beverages prior to consumption is made more difficult. In such circumstances one normally is required to utilize an ice chest and to provide ice which will last only a limited period of time and is bulky, difficult to handle and requires draining of the melted ice from time to time. In such circumstances it is highly desirable to have a method for rapidly cooling the contents of the containers prior to consumption without the necessity of these prior art inconveniences.

The prior art is replete such self-cooling beverage containers. Generally, such containers utilize a refrigerant, gas of some type, or an endothermic reaction to provide the

cooling means. Typical of such self-cooling devices known to applicant for chilling beverages and the like are exemplified by the structures disclosed in the U.S. Patent Nos. 2,746,265; 1,897,723; 2,882,691; 2,460,765; 3,373,581; 3,636,726; 3,726,106; 4,584,848; 4,656,838; 4,784,678; 5,214,933; 5,285,812; 5,325,680 and 5,331,817.

Many of these prior art structures utilize an activation process wherein the pull-tab which is utilized for removing the cooled contents of the beverage can is also utilized as the activating device to release the refrigerant from a heat exchange unit which is contained internally within the beverage can. In some instances, a differential pressure generated within the beverage can is utilized to effect activation of the heat exchange unit to release the refrigerant contained therein to cool the beverage. Although these structures function quite adequately to release the refrigerant to conduct the heat contained within the food or beverage away from the food or beverage and thereby to cool it, it has been found that such structures are complicated, expensive to produce and sometimes interfere with the consumption of the beverage from the can.

As a result, it has been recognized in the art that it is more effective and efficient to separate the activation of the heat exchange unit from the removal of the food or beverage contents subsequent to the cooling step. This has been accomplished by placing the heat exchange unit in the bottom of the can and the pull-tab at the top of the can as it is traditionally located. Examples of the such prior art apparatus are shown in U.S. Patents 4,656,838 and 4,555,741. In each of these prior art applications the heat exchange unit is affixed to the bottom of the beverage can and is also actuated from the bottom of the beverage can. The actuation in each instance includes a mechanism for puncturing a wall or diaphragm located in the bottom of the can which closes and seals the heat exchange unit. Although these structures solve some of the problems of the prior art, the mechanisms utilized are difficult to construct and do not provide adequate protection against inadvertent activation of the HEU.

Prior art devices also exist which provide an exothermic reaction to in situ heat food or beverages. Such devices are convenient and useful in the same manner and for the same reasons as above set forth with respect to self-cooling containers. One example of such

a prior art device is disclosed in prior art U.S. Patent No. 5,620,022. Although the heat exchange unit for that structure is affixed in the can bottom and is separately activated, the structure is complex and expensive to manufacture.

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Summary of the Invention

A method of manufacturing a container having a heat exchange unit therein which includes removing a predetermined amount of material from the central part of the bottom of the container, forming a flange extending substantially perpendicular with respect to the bottom and surrounding the opening, and affixing a heat exchange unit to the flange.

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A can which includes a top and bottom and having a heat exchange unit affixed to the bottom of the can by a flange formed integrally with the bottom of the can. The heat exchange unit and a valve cup disposed on each side of the flange and permanently affixed to the flange by forming.

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Brief Description of the Drawings

Figure 1 is an exploded view of a self-chilling or self-heating beverage container constructed in accordance with the principles of the present invention;

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Figure 2 illustrates one step in the formation of an attaching flange in the bottom of the beverage container;

Figure 3 illustrates the beverage container after the step as illustrated in Figure 2;

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Figure 4 illustrates the second step in the formation of the flange used in the beverage container of the present invention;

Figure 5 illustrates the beverage can subsequent to the step illustrated in Figure 4; and

Figure 6 illustrates a completed self-chilling beverage container constructed in accordance with the present invention.

Detailed Description of the Invention

Referring now more particularly to Figure 1 there is illustrated in exploded view the components of a self chilling beverage container constructed in accordance with the principles of the present invention. Although the present invention is equally applicable to self-chilling or self-heating food or beverage containers, the following description is given with respect to a self-chilling beverage container for purposes of use of illustration and description but without limitation of the invention. As is therein shown, the overall self-chilling beverage assembly 10 includes a beverage can 12 having a bottom 14 and a top (not shown). A heat exchange unit (HEU) comprises a vessel 16 having a lid 18 which will be affixed to the vessel 16 by crimping, welding, adhesives or the like. The HEU may be a single piece structure with the top necked in for attachment. The vessel 16 contains a refrigerant which may be any known to the art type of material such as hydro fluoro-carbons, chloror fluoro carbons, carbon dioxide, a mixture of hydro carbons and halogen gases or the like. In the presently preferred embodiment of this invention the refrigerant is a carbon dioxide-carbon adsorbent/desorbent system of the type disclosed in U.S. Patent 5,692,381 to which reference is hereby made and by such reference is incorporated herein. When a device of the type utilizing the carbon-dioxide system as the refrigerant is used, it becomes desirable to provide a heat sink such as is illustrated at 20 to assist in conducting the heat in the beverage contained within the beverage can 12 from the surface of the heat exchange vessel 16 internally to be exhausted from the system 10 upon activation of the heat exchange unit. Also provided is a valve cup 22 which includes a valve 24 secured thereto. A protective cover or cap 26 fits over the valve 24 to protect it from inadvertent actuation thereby activating the heat exchange unit when such is not desired and to provide an indicator to the consumer that the unit has not been activated. The

combination of the valve cup 22 and the heat exchange unit must be affixed to the bottom 14 of the beverage can 12. Such is done by providing a downwardly directed flange 28 in the bottom 14 of the can. That flange is sandwiched between the valve cup 22 and the cap or top 18 of the heat exchange unit and the material, preferably metal, from which these units are formed, is then formed such as by crimping or swaging to secure these elements together and thereby to affix the heat exchange unit permanently to the bottom 14 of the beverage can 12. An elastomeric material such as a washer 30 is positioned between the flange 28 and the inner surface 32 of the cap 18 of the heat exchange unit to provide an effective seal there between. A similar elastomeric material is coated on the exterior surface of the valve cup 22 and thus also provides a seal between the valve cup 22 and the beverage can 14. The critical factor in accordance the principles of the present invention is to provide a means for sealing and permanently attaching the heat exchange unit to the bottom of the beverage can. In accordance with the principles of the present invention this means is the downwardly directed flange 28 which as will become apparent below is formed as an integral part of the beverage can 12. Although the flange is shown directed downwardly in Fig. 1, it should be understood that with certain modifications the flange may be directed upwardly (out of the container).

By referring now to Figures 2 and 4 there is shown the apparatus for forming the flange 28 in the bottom of the can. It will be appreciated by those skilled in the art that what is illustrated in Figures 2 and 4 are schematic sketches of apparatus to carry out the fabrication methods for forming the flange 28. In actual production and particularly in mass production the equipment will be automated and much more sophisticated than that illustrated in Figures 2 and 4. Nonetheless, the principle involved will be the same and therefore the invention is not to be limited by the drawings.

In order to form the flange 28 some material must first be removed from the bottom 14 of the beverage can. As is shown in Figure 2, there is provided an anvil 34 which rests upon a foundation 36 such that the anvil is well supported and in a position to receive the forces generated by the acceptance of a punch 38. The outer diameter d1 of the punch 38 is substantially the same as the diameter of the bore 40 which is formed in the upper portion of

the anvil 34. There will be a sufficient difference between the diameters to permit clearance for the punch 38 to enter the bore 40 without binding. The material removal is accomplished by positioning the beverage can 12 over the anvil 34 with the bottom 14 of the can positioned over the bore 40. The can 12 should be centrally positioned upon the anvil 34 and an appropriate jig such as a spacer 42 may be positioned around the anvil 34. Obviously other devices may be utilized for properly positioning the can 12 centrally with respect to the anvil 34. Once the can has been thusly positioned it is moved downwardly as viewed in Figure 2 so that the bottom 14 of the can rests securely upon the top surface 44 of the anvil with the center of the bottom 14 positioned directly over the center of the bore 40. Appropriate force is then applied to the punch 38 as illustrated by the arrows 46 to move the punch downwardly and to permit the lower portion thereof to enter the bore 40. It should be noted particularly with respect to Figure 2 that only the lower portion of the punch 38 which has the diameter d1 which is substantially the same as the inner diameter of the bore 40 can enter the bore 40. Once the outwardly flared portion 48 of the punch 38 reaches the bore 40, further downward movement of the punch 38 is restricted. It will be understood however that the central portion of the bottom 14 of the beverage can 12 is severed from the beverage can by the downward movement of the punch 38. Once this occurs the structure is as illustrated in Figure 3 wherein the beverage can 12 is illustrated as having an opening or aperture 50 there-through. The aperture 50 is formed by having removed the material by moving the punch 30 from the position shown in Figure 2 downwardly into the aperture 40.

Obviously, other devices may be used for removing the material from the bottom of the can. For example, a cutting knife edge may be formed on the anvil or the end of the punch with the other surface being flat or defining a slight groove. When the surfaces meet with the can material there between, a predetermined amount of material is severed and removed. The amount of material to be removed is that which is sufficient to allow formation of the flange as described below without fracturing or otherwise destroying the integrity of the remaining portion of the bottom of the can.

By reference now to Figures 4 and 5 the second step in forming the flange

28 is illustrated. As is shown in Figure 4 the beverage can 12 is positioned over an anvil 52 which is formed similarly to that illustrated in Figure 2 and which also rests upon a foundation 54 for the purposes as above described. The anvil also includes a spacer mechanism 56 to centrally position the can 12 with respect to the center line 58 of the anvil 52. Although the anvil 52 is similar in structure to the anvil 34 and includes a bore 60 therein, it should be noted that the bore tapers outwardly as illustrated at 62 and terminates in a re-entrant bore 64 which has a diameter greater than the bore 60. Likewise, the punch 66, which is propelled downwardly as illustrated by the arrows at 68 also tapers outwardly as illustrated at 70 and terminates adjacent the upper portion of the punch 66 in a vertically disposed region 72. It will be noted by examination, that the punches 38 and 66 are constructed substantially the same, however, the anvils 52 and 34 have a differently shaped bore as above-described. Through utilization of the anvil having the bore with the flare 62 and the straight diameter 64, when the punch 66 is permitted to totally enter the bore 60 to its full limit, the inner edge 74 surrounding the opening 50 in the can 12 is moved downwardly first by the tapered surface 70 and then finally formed by being positioned between the vertical opposed surfaces 72 and 64 on the punch 66 and the anvil 52 respectively. Obviously the outer diameter of the surface 72 of the punch 66 is slightly less than the inner diameter of the vertical surface 64 of the bore 60 by an amount substantially equal to the thickness of the material of the beverage can bottom 14. The end result is as shown in Figure 5 which clearly illustrates the downwardly directed (into the container) flange 28 surrounding an opening 76 in the bottom 14 of the can 12. As above indicated the flange 28 is of a sufficient size to receive the elastomeric washer 30 and opening 32 in the cap 18 of vessel 16 around its outer diameter and to receive the valve cup 22 at its inner diameter. Through the utilization of appropriate forming tools the flange 28, the cap 18 and the valve cup 22 are formed so as to provide a sealed self-cooling beverage system.

In some applications it is desirable to affix the valve and valve by assembly to the can in such manner that there is no possibility of an internal leakage path for the refrigerant (or exothermic materials) to enter the food or beverage in the container. Such may be done by reversing the flange forming procedure as above described. The can 12 is positioned with the

opening 50 centered over the bore 64 in the anvil but with the side or body of the can extending upwardly as viewed in Fig. 4. The punch 66 is directed downwardly as above described with the result that the direction of the flange is upwardly (out of the container) as viewed in Fig. 5, and as shown by the dashed line 28. The flange 28 may then be curled over with an extension of the HEU and the valve cup received and formed as above described to provide an effective sealed permanently affixed HEU.

In some instances where the container is made of aluminum material the flange may be annealed to prevent further cracking when the crimping occurs. Such annealing may be accomplished by use of a polishing which rotates a high speed in contact with the flange. Such raises the temperature of the flange sufficiently to anneal it.

Referring now more particularly to Figure 6, there is illustrated in schematic form and in partial cross-section a completed self-cooling beverage system constructed in accordance with the principles of the present invention. As is therein shown the system 110 includes the beverage can 112 having a bottom 114 and a top 116. The beverage can 112 contains a beverage 118. A heat exchange unit 122 having a valve cup 124 including a valve 125 disposed therein and having a button 126 which may be depressed to activate the valve is provided. The bottom 114 of the can 112 has an opening and a downwardly depending flange 128 which is sandwiched between the upper end 132 of the heat exchange unit 122 and the valve cup 134. As above-described an appropriate elastomeric washer is disposed between the surfaces of the flange 128 and the valve cup and heat exchange unit to effect the desired seals. A protective cap 136 is disposed over the valve 125 and is held in place by snapping the same downwardly through the utilization of an appropriate retaining clip 138. When the upper surface of the protective cover 136 is depressed downwardly it will contact the button or plunger 126 activating the valve 125 to release the refrigerant contained within the heat exchange unit 122. If the heat exchange unit utilizes a carbon carbon-dioxide system as above described then the appropriate heat sink 140 is disposed internally of the heat exchange unit 122 and is in the form of a plurality of ribs 142 through 148 which converge at a central point 150. Each of the ribs is in contact with the inner wall of the HEU 122 and conducts the heat

contained within the beverage 118 internally through the carbon so that it may be exhausted upwardly through the valve 125 with the escaping carbon-dioxide gas. Obviously, the heat exchange unit and the refrigerant may take many other forms and may also be replaced by an exothermic reaction system without departing from the spirit or scope of the present invention which is directed to the manner of attaching the heat exchange unit to the bottom of the food or beverage container.



What is claimed is:

1. A method of manufacturing a container comprising:
a can having a top and a bottom and a heat exchange unit having a valve cup, said heat exchange unit being positioned within the beverage can and affixed to the bottom thereof comprising the steps of:
 - a. removing a predetermined amount of material centrally from said bottom of said can to provide an opening therethrough;
 - b. forming a flange extending substantially perpendicular with respect to said bottom from material surrounding said opening; and
 - c. permanently affixing said flange to said heat exchange unit and said valve cup.
2. A method of manufacturing a container as defined in claim 1, wherein said removing step includes providing an anvil and a punch defining cutting edges, positioning said beverage can with said bottom centrally disposed on said anvil and bringing said cutting edges into contact with said bottom with sufficient force for removing said material.
3. A method of manufacturing a self-cooling beverage container as defined in claim 1, wherein said removing step includes providing an anvil defining a bore having a first diameter, positioning said beverage can with said bottom centrally disposed over said bore and inserting a punch through said bottom and into said bore thereby removing said material.
4. A method of manufacturing a container as defined in claim 3, wherein said forming step includes providing an anvil defining a bore having a first diameter and a reentrant bore having a second diameter;
said second diameter being greater than said first diameter and a tapered region interconnecting; said first and second bores;

providing a punch having first and second diameters separated by a tapered section said second diameter of said punch being greater than said first diameter thereof and said second diameter of said punch being less than the diameter of said counter bore of said anvil, positioning said can bottom with said opening therein centrally over said bore in said anvil and inserting said punch into said anvil such that said tapered sections of said punch contact said tapered sections of said bore.

5. A method of manufacturing a container as defined in claim 1 wherein said affixing step includes sandwiching said flange between said heat exchange unit and said valve cup.

6. A method of manufacturing a container as defined in claim 5 wherein said affixing step further includes crimping said flange, said heat exchange unit and said valve cup.

7. A method of manufacturing a container as defined in claim 5 which includes the further step of placing an elastomeric sealing material between said flange and said valve cup and between said flange and said heat exchange unit.

8. A container having a heat exchange unit therein for heating or cooling food or beverage comprising:

an outer vessel for containing said food or beverage and having a top and a bottom;

said bottom defining an opening therethrough and a flange surrounding said opening and extending away from said bottom; and

means for non-removably affixing said heat exchange unit to said flange.

9. A container as defined in claim 8 which further includes a valve cup carrying a valve, and means for non-removably affixing said valve cup to said flange.

10. A container as defined in claim 9 wherein said flange is sandwiched between said valve cup and said heat exchange unit.

11. A container as defined in claim 10 wherein said flange extends inwardly from said bottom into said outer vessel interior.

12. A container as defined in claim 11 which further includes an elastomeric seal between said flange and said heat exchange unit and between said flange and said valve cup.

13. A container as defined in claim 9 wherein said container; said valve cup and said heat exchange unit are constructed of metal and said means for non-removably affixing includes forming those portions of said valve cup and said heat exchange unit in contact with said flange.

14. A container as defined in claim 13 wherein said forming includes crimping.

15. A container as defined in claim 10 wherein said flange extends outwardly from said bottom away from said vessel interior.

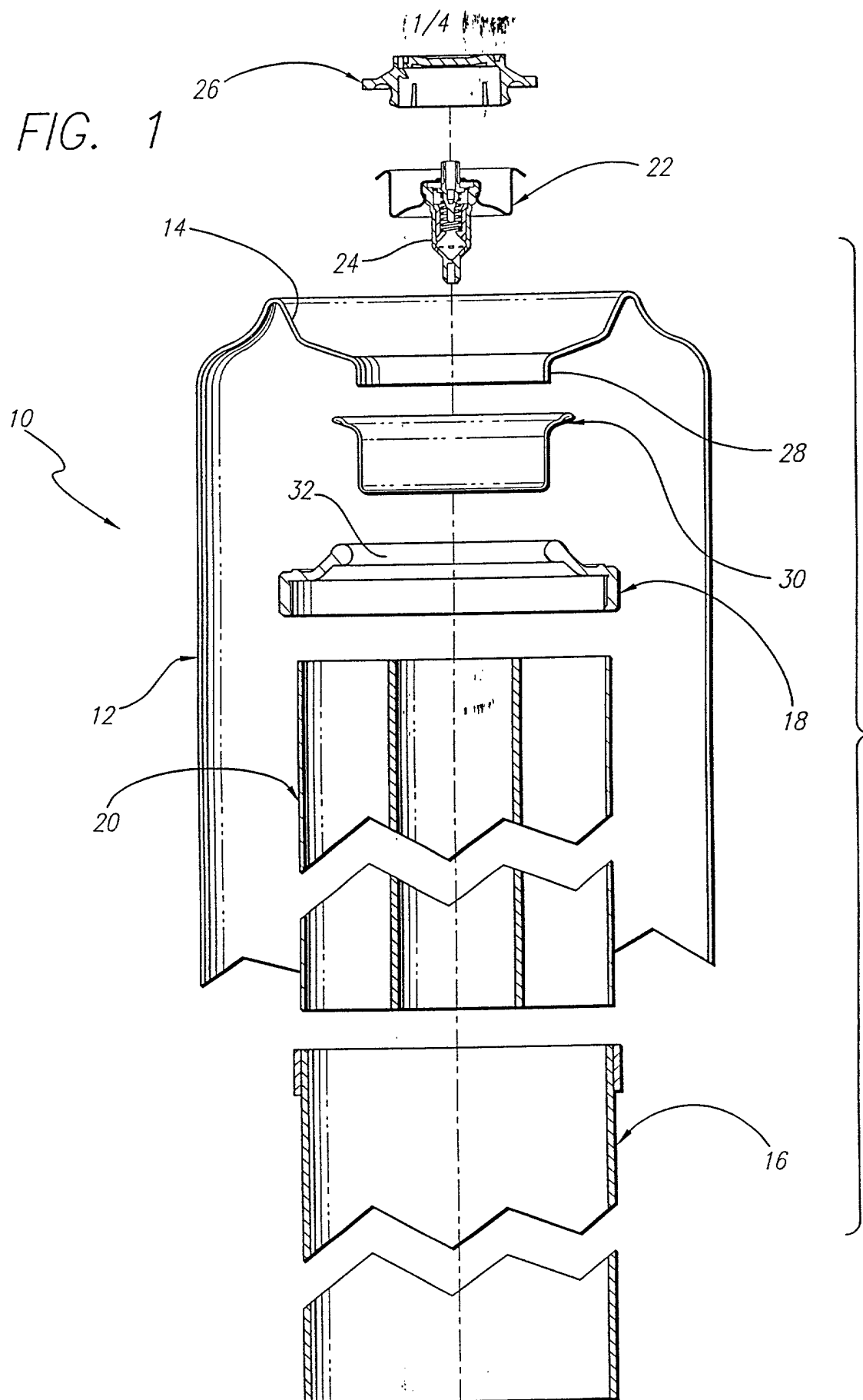
16. A container as defined in claim 15 wherein said flange extends outwardly from said bottom away from said vessel interior.

**THE APPARATUS AND METHOD FOR ATTACHING
HEAT EXCHANGE UNIT AND VALVE TO THE BOTTOM OF
SELF-COOLING AND SELF-HEATING FOOD OR
BEVERAGE CONTAINERS**

Abstract of the Disclosure

5 A method of forming a flange in the bottom of a container by first removing a portion of the container bottom and then forming or swaying the material around the opening to form a flange extending away from the container bottom. A valve and valve cup assembly along with a heat exchange unit are positioned adjacent the flange and the combination is crimped to permanently affix the heat exchange unit to the bottom of the container.

FIG. 1



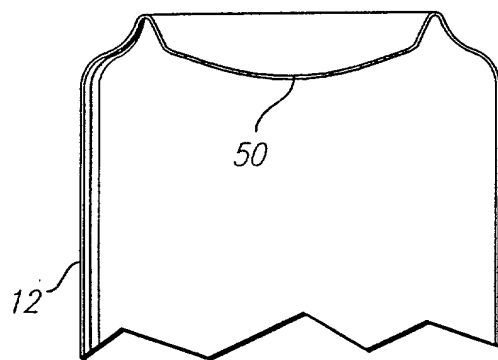


FIG. 3

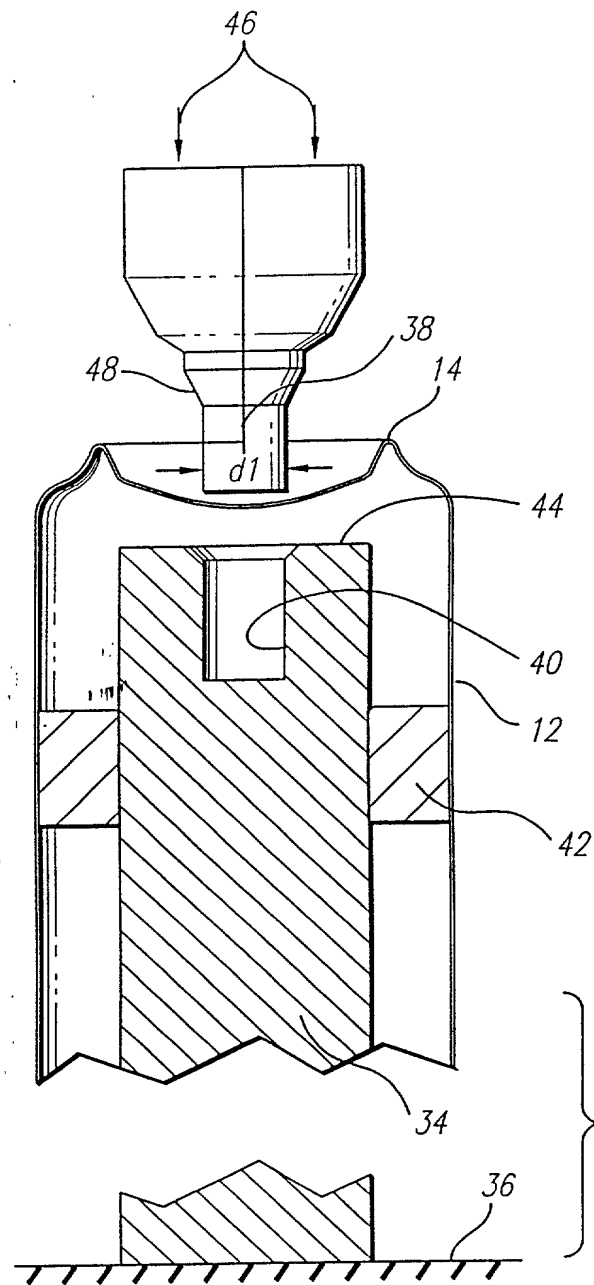


FIG. 2

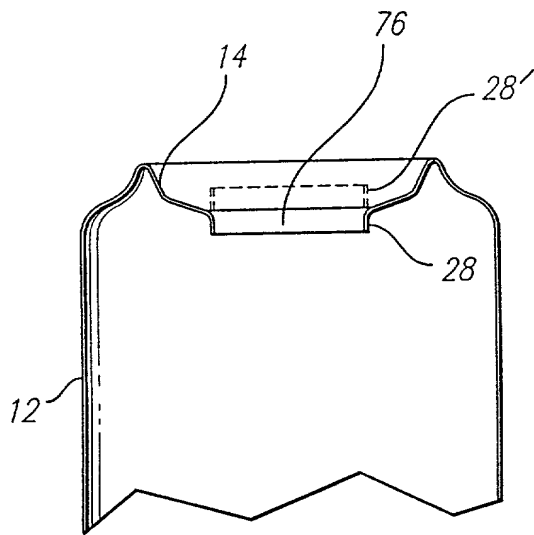


FIG. 5

3/4

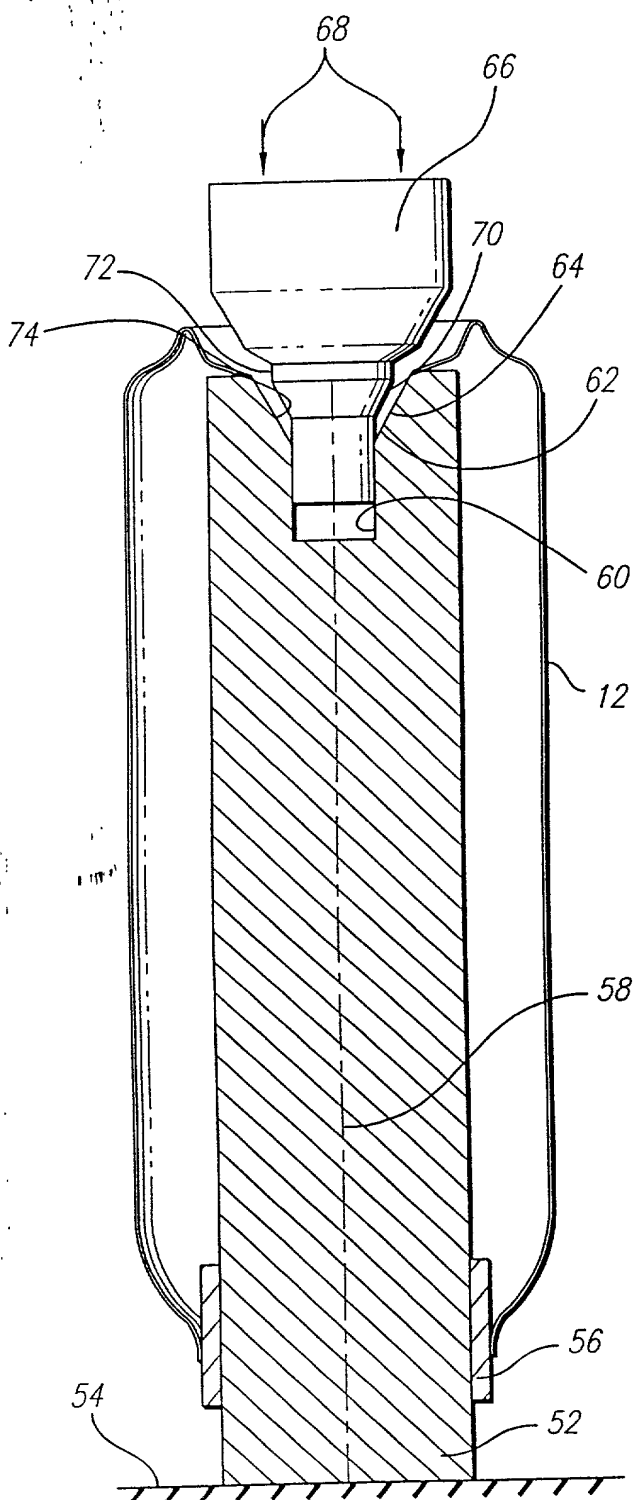
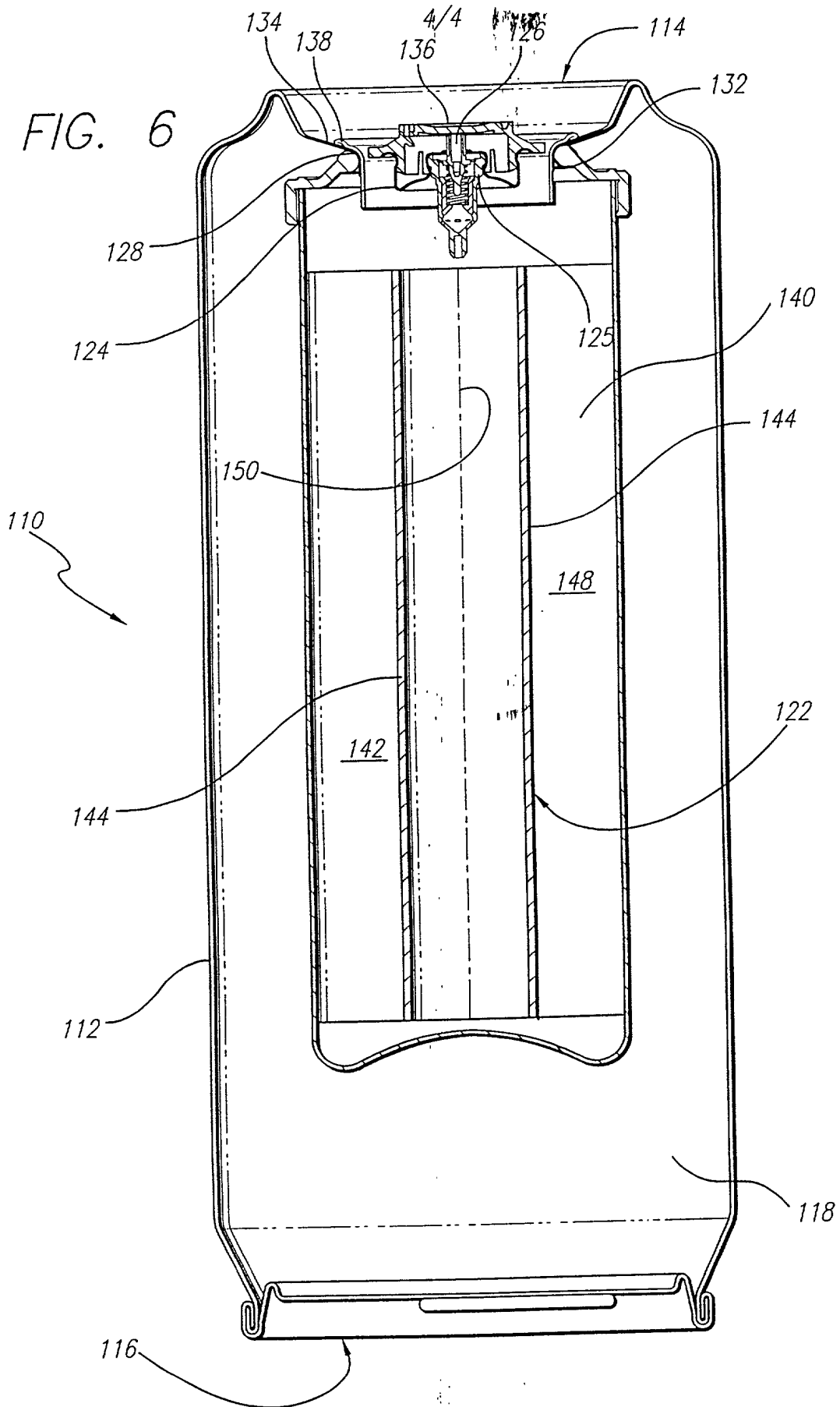


FIG. 4

FIG. 6



Docket No.
6185-221XX/987491

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

THE APPARATUS AND METHOD FOR ATTACHING HEAT EXCHANGE UNIT AND VALVE TO THE BOTTOM OF SELF-COOLING AND SELF-HEATING FOOD OR BEVERAGE CONTAINERS

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

(Number)

(Country)

(Day/Month/Year Filed)

☐

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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